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STATISTICAL BULLETIN

METROPOLITAN LIFE INSURANCE COMPANY

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Fit to Fight!

THE United States is mobilizing its strength to fight the Axis powers. Registration has just been completed of those men between the ages of 20 and 44 years who did not come under previous enrollments. The lists of earlier registrants who were deferred for various reasons are being reviewed to pick out all that may now be deemed eligible for service in the armed forces. The compelling need, since the outbreak of the war, to build up rapidly a large and effective fighting force, again directs attention to the quality of the men from whom this force will be recruited. While no figures are yet available, or are likely to be for some time, as to current rejections for military service, the American people can definitely be assured that the charge sometimes made, that 45 percent of our young men are physically unfit, is entirely unfounded. This figure, which is based on the very rigid standards of selection used while we were still at peace, is wholly misleading as an indication of the health status of our youth. The American people have been unnecessarily disturbed.

By any reasonable standard, the rank and file of America's young men will be found to measure up to the hard tasks that lie ahead of them. When properly conditioned, they will be found superior in stamina and endurance to the forces of our enemies. Furthermore, the American people may be assured that our excellent medical facilities will be freely drawn upon to strengthen the young men in our armed forces and to keep them fit. While the new standards of medical selection will bring into the Army and Navy some men with minor physical defects, many of these defects will be corrected. Many young men previously rejected are undergoing treatment for defects disclosed by their selective service examination.

But even more important, as a result of these examinations, official and voluntary health agencies are attacking such causes as poor nutrition which underlie many physical defects. This will advance our military effort by improving the health of our people, and especially of the workers who produce the materials for the men behind the guns.

Dividends in Man Power

A VERY considerable part of our fighting and productive force is the direct result of reduced mortality since the beginning of the century; and this in turn is to be credited to our organized public health effort and the remarkable advances of medical science in past decades. This effort has saved millions of babies, children, and young adults, so that now the numbers available for the fighting forces to defend the country, and for production in factory and field, are much larger than would have been possible under health conditions prevailing among us 40 years ago.

To obtain a numerical measure of what the improvement in our health conditions means in terms of man power, an estimate was made of the number of men of draft age present among us today, who owe their existence to the improvement in mortality since the beginning of the century. Taking into account on the one hand the survival rates which actually operated in the intervening years, and on the other the survival rates that prevailed at the beginning of the century (when men now 40 years old were born) it is found that 11 percent of men between the ages 20 and 44 are among us simply because of improvement in mortality experienced since 1900.

On the foregoing basis it is estimated that of the 9,000,000 new registrants of this month, 11 percent, or 1,000,000 are included in our man power because of our advances in medicine and public health, as well as our rising standards of living. For the same reasons, we now have another 1,800,000 men included among the 16,800,000 who had previously been registered. Altogether, there are among us 2,800,000 additional men available for combat and production who would not have been here if our country had continued to the present with the mortality of 1900. This is a number equal to the entire draft army of 1917-1918. It is more than twice the number of our men who actually fought in France in the last World War.

Even so, this estimate of lives saved is a minimum number. It does not take into account the fact that many men of draft age would not even have been born because their parents would have been the victims of the higher mortality as of 1900. The contribution to our man power on this score must also be sizable, for this item depends on the improvement of mortality from 1900 to 1921, the period covering essentially the years of birth of the men of draft ages at the present time.

The many efforts that have gone into the improvement of the health of our people have contributed materially to our striking power in this war. Not only have these efforts given us more man power, but they have also given us the health and stamina necessary for a successful outcome. The situation calls for the maintenance of our present standards of public health and medical care.

Is America's Population Increasing?

DURING each year of the last decade, our country has enjoyed an increase of about 1,000,000 persons resulting from the excess of births* over deaths. On its face, the answer to the question in the title is definite and positive: The population is still increasing fairly rapidly. This condition may give the impression that the current excess of births over deaths is sufficient to assure our continued increase in future years. Such a supposition is, however, very far from being warranted. Closer examination of the facts shows very clearly that we are probably headed toward a stationary population and perhaps even to a declining one.

Crude birth rates and death rates as published each year are not good guides as to the true capacity for growth of our population. Much more important is it to observe the fertility rates which prevail, and to see whether these are sufficient to balance the mortality. Fertility rates may be measured by the number of daughters born annually to a thousand women within a specified age group. Are these daughters sufficient in number to replace their mothers in the next generation? It is important to observe in the first place that our fertility rates have been going down steadily during the last 20 and more years. This is shown very clearly in the graph on page 5. For each age group the fertility rates dropped in passing from 1920 to 1930 and again to 1940. The decreases were quite marked from 1920 to 1930 at ages 20 and over. Fertility at ages 15 to 29 in 1940 was not far below that in 1930, but at the higher ages the decreases were appreciable.†

With the fertility rates for 1940 at hand, and with a life table for white females in the United States for 1940 available, it is a simple matter to find the number of daughters that will arise among a generation of females traced from birth to the end of their reproductive period. The ratio of the number of daughters found in this way to the number of females starting out together from birth in the generation is known as the "net reproduction rate." If this ratio is unity, the conditions of fertility and mortality are just balanced, and such as to lead ultimately to a stationary population. For the white population of the United States in 1940 the net reproduction rate figures out to 1.024,* so that it can be said that conditions of fertility and mortality were such as to lead to a population increase of 2.4 percent per generation of about 28 years. The fertility and mortality of 1930 gave a net reproduction rate of 1.079, and with the conditions of 1920, the figure was 1.252, as shown in the last column of the table on page 4. Thus, within two decades, this "true" measure of our population growth has fallen from an ample

*Except where otherwise noted, recorded births have been increased to allow for under-registration. See the first footnote to the table on page 4.

†For a more complete description, see "Conflicting Trends in the American Birth Rate," STATISTICAL BULLETIN, March 1941.

margin until it is now only a little above the level required for a stationary population.

The net reproduction rate is figured per generation of about 28 years. From it can be deduced the corresponding "true" annual rate of natural increase. This is the rate that would ultimately prevail if the present conditions of fertility and mortality remained unchanged. As indicated in the table below, the true rate of natural increase in 1920 was 8.0 per 1,000; this fell to 2.8 per 1,000 in 1930, while in 1940 it was only 1.0 per 1,000, or only a hairline above the zero mark. For each of these periods the *crude* rate of natural increase—that is, the excess of annual births over deaths per 1,000 of population—was appreciably higher than the corresponding true rate, the crude rates being 13.5 in 1920, 9.3 in 1930, and 8.5 in 1940. Thus, while the true rate of natural increase in 1920 was about two thirds of the crude rate for that year, in 1940 the true rate was less than one eighth of the crude rate.

It has already been pointed out in these pages that the relatively high margin of birth rate over death rate which we are now experiencing is the result of the favorable age structure of our population. With a relatively high proportion of our population still at the reproductive ages, where mortality is low, it is natural that the crude birth rate should be high and the crude death rate low, and also that the margin between the two should be large. But the prevailing age structure is only temporary, and, *under present conditions of fertility and mortality*, will gradually give way to an age structure in which the excess of birth rate over death rate will be only 1.0 per 1,000 population.

This gradual change in the rate of natural increase will be the result of corresponding changes in the birth rate and death rate, which themselves will arise from the changing age structure. For, as the proportion of population in the reproductive ages decreases and the proportion in the older ages increases, the birth

CRUDE AND "TRUE" BIRTH RATES, DEATH RATES, AND RATES OF NATURAL INCREASE FOR THE WHITE POPULATION OF THE UNITED STATES, 1920, 1930, AND 1940

YEAR	OBSERVED CRUDE RATES PER 1,000 POPULATION			"TRUE" RATES PER 1,000 POPULATION*			NET REPRODUCTION RATE*
	Birth Rate	Death Rate	Rate of Increase	Birth Rate	Death Rate	Rate of Increase	
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
1920	26.1†	12.6	13.5	22.6	14.6	8.0	1.252
1930	20.1†	10.8	9.3	17.5	14.7	2.8	1.079
1940	18.9*	10.4	8.5	15.4	14.4	1.0	1.024

*In computing the net reproduction rate, the "true" rates, and the crude birth rate for 1940, an adjustment of 8.5 percent was made for under-registration of births.

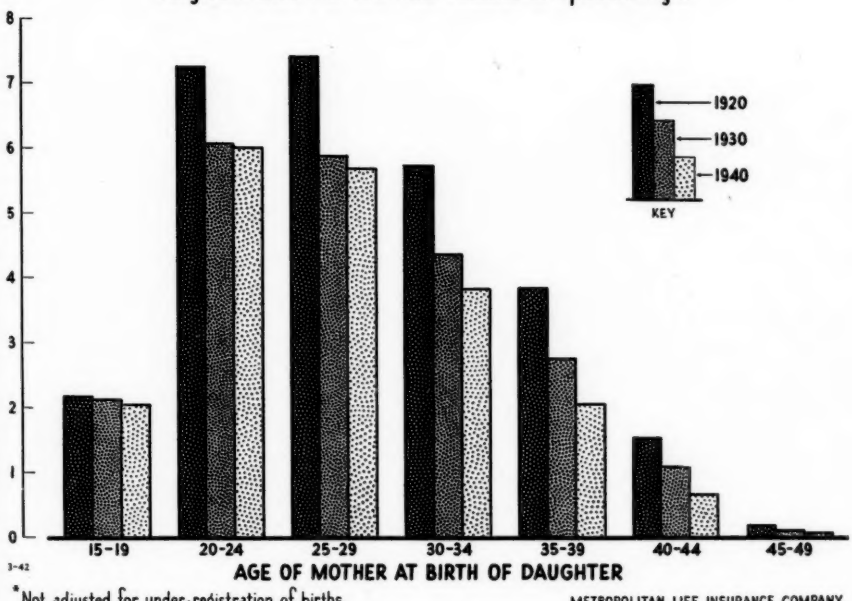
†From Thompson and Whelpton *Population Trends in the United States*, page 263. These birth rates are adjusted for under-registration.

rate will further decline and the death rate will materially increase. For example, among white persons in 1940 the crude birth rate was 18.9 per 1,000. But the birth rate that would ultimately result from the fertility and mortality of 1940, after the readjustment of the age distribution—what we might call the "true" birth rate—was 15.4 per 1,000. At the same time the death rate would rise from the crude 10.4 to the "true" 14.4 per 1,000 population.

For 1941 we have at present only provisional data, which indicate that the true rate of natural increase for that year will be about 2.8 per 1,000 —practically identical with that for 1930. The sharp rise in 1941 over 1940 reflects in part the revival of economic activity, and in part a rather sudden upswing in the marriage rate. The outlook for the next few years, however, is not quite as reassuring. With a large element of our able-bodied men in the armed services—and the consequent disruptions of family life and postponements of marriage—the effective fertility of the American people is likely to fall below the level required to maintain a stationary population. Evidently, our population policy must be given serious consideration in the councils that are guiding the Nation through its problems in these difficult times.

FERTILITY OF WHITE WOMEN IN THE UNITED STATES, 1920, 1930 & 1940*

Daughters Born Per 100 Total Females of Specified Ages



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*Not adjusted for under-registration of births

METROPOLITAN LIFE INSURANCE COMPANY

Death Claim Disbursements in 1941

THE disbursements on account of death claims among the policyholders of the Metropolitan Life Insurance Company amounted to $183,267,726 in 1941, as compared with $182,436,068 in 1940. The former was the largest amount distributed in claim payments in any one year in the history of the Company. The increased amount of claim payments in 1941 was not due to higher mortality, however, but to the larger number of policyholders protected by the Company. In fact, the year 1941 registered the lowest mortality rate on record. In only one respect could the experience for the year be said to be poor, namely, in the number of accidental deaths. Even in this respect the record was much more favorable than that of 10 years ago.

Altogether about 87.8 percent of the claim payments were on account of death from natural causes, and 12.2 percent from external or accidental causes. Among the external causes, suicides accounted for 2.1 percent, homicides for 4/10 of 1 percent, and accidents for 9.7 percent. The disbursements for motor-vehicle accidents reached a new high of $8,536,834. As was noted in the January BULLETIN, the 1941 rate for motor-vehicle accidents was up sharply from 1940 and was the highest since 1937. This year the restraining influences of war measures in regard to cars, their tires, and the consumption of gasoline should result in a decided decline in motor-vehicle traffic, with a corresponding decrease in claim payments.

To counterbalance this expected decline in claim payments for accidents from motor vehicles there is the danger of increased disbursements on account of industrial accidents. For, the defense effort in industry may well result in a rise in industrial accidents as fatigue accumulates from long hours of steady employment, and as safety measures are relaxed in the pressure for increased production. Another incident in connection with the war effort which may well affect the accident situation in 1942 is the proposed plan to train at least 1,000,000 men for the air force by the end of the year. A tabulation of the causes of death among enlisted personnel shows that already, in 1941, deaths in aviation accidents were of considerable importance.

Disbursements on account of natural causes amounted to $160,827,546. Well in excess of two thirds of this was paid out for diseases which, at the present time, are often incurable—namely, cancer and the diseases of the cardiovascular-renal group. The diseases of the heart, arteries, and kidneys alone accounted for more than one half of the claim payments for natural causes of death. Chronic heart disease ranked first, by a wide margin, with disbursements of $34,080,426 on its account; diseases of the coronary arteries and angina pectoris ranked third with disburse-

ments of $26,182,398; cerebral hemorrhage was fourth with payments of $12,529,762; and chronic nephritis was fifth with disbursements of $10,931,404. The disbursements on account of diseases of the coronary arteries and angina pectoris were almost as great as those for cancer in 1941. The amount of the payments on account of this disease is noteworthy, inasmuch as comparatively few deaths were assigned to this cause as recently as 10 years ago. Diseases of the coronary arteries rank higher on the basis of disbursements than mortality rates because of the high average amount of each claim. Two factors contribute to this result. In the first place, the mortality of males from coronary diseases is higher than that of females, and in the second place the disease is more common or at least more often recognized among the well-to-do class.

Cancer ranked second in 1941 and accounted for 14.7 percent of the claim payments—$26,852,708. In 1940 the proportion was 13.8 percent, while 10 years earlier it was only 10.1 percent. Cancer has become a very expensive disease.

Tuberculosis remained in sixth position among the natural causes of death in 1941, accounting for 4.1 percent of total disbursements as compared with 4.2 percent in 1940. The continuous decline in mortality from tuberculosis has reduced the proportion of payments on its account by more than 40 percent in the past 10 years, and by more than 70 percent in the past 20 years. In 1921, tuberculosis was the leading cause of claim payment.

Disbursements for influenza and pneumonia—seventh in rank as a cause of claim payment—have declined even more rapidly than those for tuberculosis. Claim payments on account of influenza amounted to $3,490,600 in 1931 as compared with $1,345,619 in 1941, while payments for pneumonia dropped from $9,618,680 to $5,259,491 in the 10 years. These decreases occurred too during a period when total claim payments were increased by approximately a sixth.

Although the mortality record for diabetes was favorable last year as compared with the preceding year, the disbursements on its account have increased in the past decade. In 1931 disbursements for diabetes amounted to $3,100,193. In 1941 the diabetes account was $5,168,442, or more than twice as large as that for appendicitis and four times as great as that for influenza.

The only other cause of death in the attached table to account for more than 1 percent of claim payments was appendicitis. While this disease is much less important now than formerly, the payments on its account in 1941 were $2,018,736. Considering that deaths from this cause are largely preventable, this item is noteworthy.

The remarkable improvement in maternal mortality in the past decade is also reflected in the present death claim disbursements of the Company for this cause. The amount paid out for puerperal

deaths in 1941 was only $658,828, or less than ½ of 1 percent of the total. In 1931, when the total death claim account was much less, the disbursements for maternal deaths amounted to as much as $1,385,406.

In general, the following table shows that increasing proportions of the death claim disbursements are arising each year from the so-called degenerative conditions. The disbursements for tuberculosis, pneumonia, and appendicitis are steadily becoming of less importance. The account for the external causes remains high.

AMOUNTS DISBURSED ON ACCOUNT OF DEATHS FROM SELECTED CAUSES. ENTIRE EXPERIENCE OF THE METROPOLITAN LIFE INSURANCE COMPANY. ALL AGES. 1941, 1940, AND 1931 COMPARED

CAUSES OF DEATH	1941 AMOUNT	PERCENT OF TOTAL		
		1941	1940	1931
ALL CAUSES—TOTAL	$183,267,726(a)	100.0	100.0	100.0
Natural causes of death	160,827,546	87.8	87.8	82.3
Chronic heart diseases (b)	34,080,426	18.6	18.1	15.1(c)
Cancer—all forms	26,852,708	14.7	13.8	10.1
Diseases of the coronary arteries and angina pectoris	26,182,398	14.3	13.2	(d)
Cerebral hemorrhage	12,529,762	6.8	7.1	6.2
Chronic nephritis	10,931,404	6.0	6.3	6.7(c)
Tuberculosis—all forms	7,479,159	4.1	4.2	7.3
Tuberculosis of the respiratory system	6,936,180	3.8	3.9	6.6
Influenza and pneumonia	6,605,110	3.6	3.8	8.3
Influenza	1,345,619	.7	.7	2.2
Pneumonia—all forms	5,259,491	2.9	3.1	6.1
Diabetes mellitus	5,168,442	2.8	3.0	2.0
Appendicitis	2,018,736	1.1	1.4	2.1
Puerperal state—total	658,828	.4	.4	.9
Typhoid fever	91,024	.1	.1	.3
Diphtheria	31,621	.02	.02	.1
External causes of death	22,440,180	12.2	12.2	17.7
Suicides	3,830,775	2.1	2.7	4.3
Homicides	866,003	.4	.5	1.2
Accidents—total	17,743,402	9.7	9.0	12.2
Accidental drowning	1,401,962	.8	.7	1.0
Traumatism by fall	2,556,653	1.4	1.4	1.5
Railroad accidents (e)	1,014,613	.6	.5	.8
Motor vehicle accidents	8,536,834	4.7	4.0	4.8

(a) Includes reinsurance received from other companies, $680,003.

(b) International List (1940) titles 92, 93 (c), (d), (e), and 95.

(c) Not strictly comparable with the figures for the other years, owing to changes in classification procedure.

(d) Not available.

(e) Includes collisions between automobiles and railroad trains

Family History and Longevity

IN DETERMINING the individual's prospect for long life, a good environment seems to be of greater weight than having long-lived parents. This is indicated in a recent study which the Metropolitan Life Insurance Company made in order to ascertain the effect of the family history on longevity. The study was based on the mortality experience over the past 40 years among 118,000 white men between ages 20 and 64 at the time they became insured in the Ordinary Department of the Company in the years 1899 to 1905.*

It was found that the most important single factor in the longevity of these men was whether or not their parents were living when they applied for insurance. The lowest mortality—12 percent below the Ordinary average—was recorded for the men both of whose parents were living when the insurance was issued. The highest mortality—11 percent above the general Ordinary experience and about 25 percent higher than the best group—was recorded for those whose parents were both dead. The mortality among men with one parent living at the time they took out insurance was slightly lower than in the general Ordinary experience, but 10 percent above the best group. These differences in the relative mortality between the three main categories were found consistently in subdivisions according to the age when insured.

These differences, however, cannot be in any considerable degree an effect of heredity. For, when the policyholders in each of the three groups were examined with respect to the age attained by their parents, it was found that there was no observable relation between that age and the mortality of their offspring, the policyholders. Those whose parents died at relatively advanced ages did little or no better than those whose parents had died in middle age or earlier.

The differences observed between the longevity of those whose parents were living and those whose parents had died must, therefore, be due in large measure to other circumstances than heredity. Such a circumstance is the adverse effect upon family life and usually upon family finances when one or both of the parents are deceased. Certainly, orphanhood has a detrimental and often lasting effect on the health and mortality of young people. The children in broken families are more poorly housed, fed, and clothed, and receive less medical attention than other children. More of them are compelled to go to work at young ages and, therefore, at unskilled jobs. Conversely, there are definite advantages, entirely unrelated to hereditary factors, enjoyed by children in families where the parents survive to old age. Aside from the financial and social aid to offspring

*The full details of this study are reported in a paper "The Inheritance of Longevity—A study Based Upon Life Insurance Records," by Louis I. Dublin, Ph.D., and Herbert H. Marks, to appear in the forthcoming "Proceedings of the Fifty-Second Anuual Meeting of the Association of Life Insurance Medical Directors of America."

which many such parents contribute, there are the mental and spiritual effects of family solidarity, all of which have an indirect influence on health and longevity.

However, even if all the advantage of the group with the lowest mortality in the present study were attributable to heredity, the maximum difference in expectation of life at age 20 between this group and the worst group is no more than three years. This is appreciably less than the figure of five years which have been added to the expectation of life of young men in the general population during the 40 years covered by the study. This has been achieved by intensive application of new methods of disease prevention, made possible by our rapidly growing knowledge of medicine. Thus, in adult life, huge reductions have been made in the mortality from typhoid, pneumonia, tuberculosis, and other infectious diseases. There has been a great expansion in medical and public health facilities. Surgery has made great strides. Campaigns for accident prevention have cut the toll of accidents, despite a large rise in the mortality from automobile accidents. Popular health education has improved personal health habits. Finally, powerful impetus to health has been afforded by the large-scale rise in the standard of living.

Clearly, therefore, recent gains in longevity through improvement of environment are distinctly greater than those which can be expected to accrue from a good family history. Furthermore, intensive application of our medical and sanitary knowledge would add another six years of life to the present expectation at age 20. It would take generations to achieve through selective action of heredity, what has already been accomplished in a relatively short time by improvement in environmental conditions, and what is likely to be achieved by these methods in the next generation.

In view of the war, we can perhaps not expect substantial improvement in adult mortality in the immediate future. Any setback should, however, be only temporary. Indeed, certain circumstances associated with the war effort may actually bring an accelerated reduction in mortality after the war. Thus, service in our armed forces will bring physical advantages to many young men which will be of benefit to them and their families on their return to civilian life. Some are having their first contact with modern medical service. The war-intensified program of medical research in prevention and treatment of disease and injuries has already made valuable new contributions to general medicine. Civilians, too, are more conscious of health, and popular education and interest in good nutrition has been intensified. Even rationing may bring its blessings. Factors such as these were largely responsible for a reduction in mortality after the last war and this may be repeated after the present conflict.

Comparative Data on the Causes of Death Among Industrial Policyholders

The following table shows the mortality among Industrial policyholders for January 1942 and January 1941, together with the death rates for the years 1941, 1940, and 1939.

DEATH RATES* PER 100,000 POLICYHOLDERS FROM SELECTED CAUSES. WEEKLY PREMIUM-PAYING INDUSTRIAL BUSINESS — METROPOLITAN LIFE INSURANCE COMPANY

CAUSES OF DEATH	ANNUAL RATE PER 100,000 POLICYHOLDERS*				
	January 1942	January 1941	YEAR		
			1941	1940	1939
ALL CAUSES—TOTAL	793.5	843.2	744.4	760.9	760.0
Typhoid fever	0.3	0.4	0.5	0.7	0.7
Measles	.5	.3	.8	.3	.6
Scarlet fever	.4	.3	.4	.6	.7
Whooping cough	.9	1.2	1.3	1.2	1.6
Diphtheria	.6	.7	.7	.8	1.3
Influenza	6.3	19.1	7.8	7.9	9.9
Pneumonia (all forms)	37.0	50.9	30.5	35.5	42.8
Tuberculosis (all forms)	41.6	41.9	42.8	44.6	45.2
Tuberculosis of respiratory system	38.0	38.2	38.9	40.2	40.6
Syphilis	11.6	9.6	11.5	12.0	11.2†
Cancer (all forms)	99.2	105.3	104.8	104.4	101.7
Diabetes mellitus	29.3	31.7	27.4	29.8	27.7
Cerebral hemorrhage	63.3	65.7	60.6	61.0	59.7
Diseases of the coronary arteries and angina pectoris	66.0	58.3	54.6	53.1	46.5
Other chronic heart diseases‡	173.0	178.4	156.1	159.5	161.0
Diarrhea and enteritis	3.6	3.1	5.0	4.6	5.4
Appendicitis	5.5	6.8	7.4	9.3	10.3
Chronic nephritis	53.2	56.4	51.9	57.3	51.8
Puerperal state—total	4.3	3.4	4.8	4.9	5.4
Suicides	7.1	8.3	7.6	8.7	8.8
Homicides	3.6	3.5	3.6	3.7	4.4
Accidents—total	54.0	51.3	50.1	46.5	46.2
Home accidents	11.7	13.3	11.1	11.7	11.7
Motor vehicle accidents	24.2	23.5	20.8	18.2	18.3
All other causes of death	131.9	146.7	114.1	114.3	117.1

*The rates for 1941 and 1942 are subject to slight correction, since they are based on provisional estimates of lives exposed to risk.

†Excludes aneurysm of the aorta.

‡International List (1940) titles 92, 93 (c), (d), (e), and 95.

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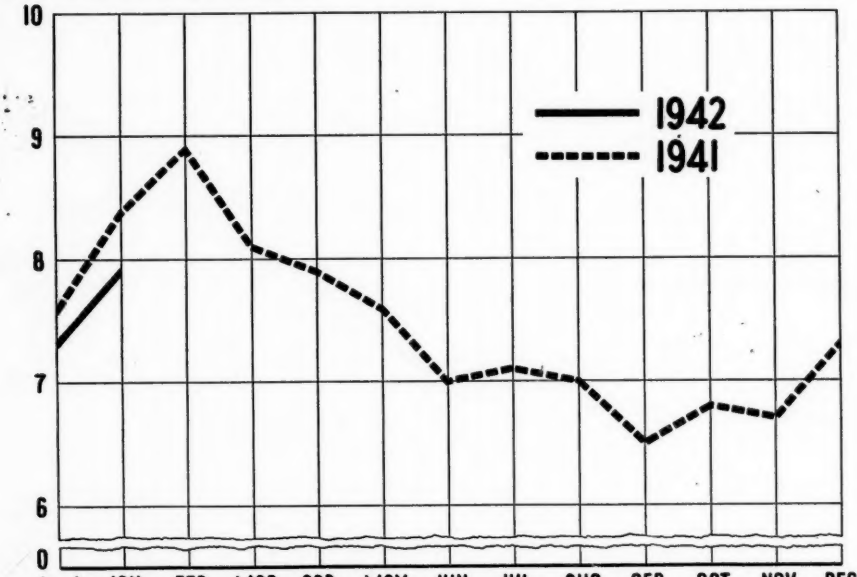
MORTALITY FROM ALL CAUSES

METROPOLITAN LIFE INSURANCE COMPANY
INDUSTRIAL DEPARTMENT, WEEKLY PREMIUM-PAYING BUSINESS

DEATH RATES PER 1,000 · ANNUAL BASIS



(DEC.)	JAN.	FEB.	MAR.	APR.	MAY	JUN.	JUL.	AUG.	SEP.	OCT.	NOV.	DEC.
1941	8.4	8.9	8.1	7.9	7.6	7.0	7.1	7.0	6.5	6.8	6.7	7.3
1942	7.9											

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